REDUCING THE "BIG BOXES" IN THE MEB

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OUTLINE

THESIS: The current planning for reducing the MEB's Big Boxes is adequate for the Marine Corp's future requirements.

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REDUCING THE "BIG BOXES" IN THE MEB

Desert Shield and Desert Storm demonstrated our requirement to project power anywhere in the world. To insure the United States Marine Corps remains a viable option for future operations, the Corp must be prepared to meet its expanding mission with less equipment and fewer personnel. A result of this new thinking is a demand to reduce the airlift and sea-lift requirements of a Marine Expeditionary Brigade (MEB). One way this reduction is achieved is by replacing the large communication and computer electronic equipment used to support the command element (a.k.a. Big Boxes) with smaller, more capable systems.

The objective of this research paper is to explore the planned reductions of Big Boxes in the MEB and to answer the question 'are these reductions sufficient?' This paper examines the current equipment configuration of the MEB and identifies ways in which the Big Boxes in the MEB are being replaced or eliminated. The key is to identify changes to equipment size and weight without diminishing capability. We selected three significant areas in which reduction in equipment lift requirements may be possible. The three areas are ground Communication-Electronics equipment, the Marine Air Command and Control System equipment, and the

special intelligence and signal intelligence equipment. Each section of the paper addresses one of these areas and in each we discuss current equipment capabilities, examine projected equipment replacements and analyze the resulting impact to capabilities and lift requirements.

GROUND COMMUNICATIONS/ELECTRONIC EQUIPMENT

The equipment discussed is provided to the MEB commander by the individual Communications Battalions. The mission of the Communications Battalion is to provide communications trunking and terminal facilities between the MEB Command Element and its senior, adjacent, and subordinate headquarters.

1. HOW DATA WAS COLLECTED

Information on the future development of the equipment discussed was obtained through interviews conducted at the Marine Corps Acquisition and Development Command. Each piece of equipment has an individual project officer who is responsible for the development and procurement of the item. Information was also obtained from a conference held between FMFLANT and FMFPAC which identified the communication equipment required by the MEB. In some cases items identified by the conference are currently being upgraded or replaced in order to increase capability and decrease the

overall weight and footprint of the command element. The recommended changes will be implemented within the next five years.

2. CURRENT EQUIPMENT END SIZE

Listed below is the current table of authorized equipment provided to each MEB command element. This equipment support is provided by the Communications Battalion Support Company.

EQUIPMENT	QUANTITY	STATUS
AN/TSC-96A	1	upgrade - FY 1993
AN/TSC-85	1	upgrade - FY 1994
AN/TSC-93	2	upgrade - FY 1994
AN/GRC-201	4	replace - FY 1992
AN/TTC-38	1	replace - FY 1991
AN/TGC-37	1	replace - FY 1991
AN/TYC-5A	1	replace - FY 1991

3. EQUIPMENT TO BE UPGRADED

a. AN/TSC-96A

The AN/TSC-96A provides terminal and transmission equipment in two shelters for three UHF satellite communications channels. One channel is secure, half-duplex teletype for Naval Modular Automated Communications. A second channel is secure, half-duplex digitized voice. The

third channel may provide either 4 multiplexed fleet broadcast channels from a group of 15 or an additional secure voice channel. One AN/TSC-96A would be provided to the MEB commander for implementing a high speed record traffic and secure voice capability with the nearest NAVCAMS. It is transported by two 5-ton trucks. The AN/TSC-96A upgrade will significantly decrease its footprint. The planned equipment will fit into a shelter small enough to be carried by one HMMWV heavy variant vehicle. This shrinkage is due to the use of more compact computers and printers. The upgrade will also replace the large, attached antennas with a single, smaller, non-attached antenna. The new AN/TSC-96A should be available to the Fleet during the 1993 fiscal year. See Table 3-1 for mobility comparisons.

b. AN/TSC-85 and AN/TSC-93

These pieces of equipment will be discussed together because their mission and the upgraded design changes are very similar. The AN/TSC-85 is a nodal, non-nodal, or point-to-point tactical communications terminal. This terminal transmits voice and data traffic via an SHF carrier from a remote or collocated multiplexer van. The terminal can receive simultaneously up to four SHF carriers simultaneously, demodulating the carriers and supplying digital data to either the self-contained multiplexing equipment or the remote van. It is transported on one 5-ton

COMM. EQUIP. MOBILITY COMPARISON

OLD NOMENCLATURE	SQFT	CUFT	WGT	NEW NOMENCLATURE	SQFT	CUFT	WGT
AN/TSC-96A	79	630	7500	NOT AVAIL.	60	506	3936
AN/TSC-85A	89	615	7365	NOT AVAIL.	60	506	3936
AN/TSC-93A	48	279	5082	NOT AVAIL.	60	506	3936 *
AN/GRC-201	117	807	4464	AN/TRC-170	48	279	3092 **
AN/TTC-38	115	1380	6075	AN/TTC-42	90	629	5500
AN/TGC-37 AN/TYC-5A	279 178	2302 1660	24368 11850	AN/MSC-63A	80	640	7000

TOTAL SAVINGS

SQ FT - 742 (57%)

CU FT - 5964 (57%)

WGT - 44548 lbs. (52%)

* EACH PIECE OF EQUIPMENT REPLACES 2 OF THE OLDER TYPE

** EACH PIECE OF EQUIPMENT REPLACES 4 OF THE OLDER TYPE

TABLE 3-1

truck with the 8-foot antenna mounted on a trailer or the 20-foot antenna mounted on a mobilizer.

The AN/TSC-93 is a sheltered 6 or 12 channel terminal which provides voice, data and teletype communications. The terminal provides the capability to transmit and receive via an SHF carrier, a 6, 12, or 24 PCM channels of voice traffic and two order-wire utilizing self-contained redundant multiplexer equipment. It is transported on one 5-ton truck with the 8-foot antenna mounted on a trailer or the 20-foot antenna mounted on a mobilizer. The system is employed in a hub-spoke configuration with the AN/TSC-85 being the hub and the AN/TSC-93s being the spokes. The AN/TSC-85 is located at the command element, and one of the AN/TSC-93s is attached to each of the subordinate commands.

A single piece of equipment under development will replace either of these two systems. The new system can be configured to replace the AN/TSC-85 or the AN/TSC-93. The new system will no longer require transportation by a 5-ton truck and trailer, instead it will, using modern, compact equipment, be placed in a new shelter on a heavy variant HMMWV. The trailer will be eliminated because the new antenna is light weight fiberglass which can be disassembled and placed inside the shelter for transport. The antenna frame weight will be reduced by using aluminum rather than steel. The U.S. Army is currently leading the design and acquisition of the HMMWV configured AN/TSC-85 and AN/TSC-93.

The upgraded versions are expected to be received for use during the 1993-1994 fiscal year. See Table 3-1 for detailed mobility comparisons.

4. EQUIPMENT TO BE REPLACED

a. AN/GRC-201

The AN/GRC-201 is a multichannel system that provides up to 24 full-duplex channels of communications in either a secure or non-secure mode. The two major components of the system are the Radio Set AN/GRC-201 and the Telephone Terminal Set AN/TCC-72, both requiring separate shelters. Four AN/GRC-201s are provided to the MEB to establish a multichannel trunking system between the MEB command element and its subordinate elements. The AN/GRC-201 is only interoperable with another AN/GRC-201. Transporting the AN/GRC-201, AN/TTC-72, generator and antenna requires three M-1028 (CUCV) vehicles with trailers. The AN/GRC-201 is being replaced by the AN/TRC-170. The AN/TRC-170 is also a troposcatter radio terminal used to support long haul digital trunking. The AN/TRC-170 has a higher digital data rate than the AN/GRC-201 and is interoperable with the AN/TRC-138 and the AN/TRC-175. The AN/TRC-170, generator, antenna, and ECU will be transported using two HMMWV heavy variant vehicles and trailers, providing a smaller footprint and greater flexibility. The

AN/TRC-170 is expected to be delivered to the Marine Corps during the 1992 fiscal year. See Table 3-1 for mobility comparisons.

b. AN/TTC-38

The AN/TTC-38 is an automated control central office used to provide switching in an area communications system. It is an analog switch capable of interfacing with military and civilian switching systems. The system provides for the trunking of 48 groups and for connections of up to 133 simultaneous calls. Each AN/TTC-38 is accompanied by a Control-Test-Maintenance Group, the OK-267/TTC-38, which is housed in its own S-280 shelter. One AN/TTC-38 is provided to the MEB and is transported by two 5-ton trucks. The AN/TTC-38 is now being replaced by the AN/TTC-42 Automated Telephone Central Office. It is configured in one S-280 shelter and provides automatic switching services and subscriber service functions to digital secure and non-secure voice terminal telephone instruments. The AN/TTC-42 also provides automatic switching for dial pulse loops. The AN/TTC-42 is currently being fielded in Saudi Arabia and is transported by one 5-ton truck. See Table 3-1 for mobility comparisons.

c. AN/TYC-5A and AN/TGC-37

These pieces of equipment will be discussed together since they are both being replaced by one item. The AN/TYC-5A Data Communications Terminal is a

transportable communications terminal which provides the tactical field communications center with DCS AUTODIN interface. It is used to pass operational and administrative traffic to commands located in and out of the objective area via HF radio or satellite link. The AN/TYC-5A may also terminate to lease lines providing connectivity to DCS for AUTODIN message traffic. The AN/TYC-5A is transported using one 5-ton truck.

The AN/TGC-37 Communications Central is a transportable teletype exchange for transmitting, receiving, recording, and rerouting teletype message traffic. It is capable of running six full-duplex, 100 word per minute, secure teletype circuits. It weighs 20,000 lbs and is transported by one M-923 truck.

These two pieces of equipment are currently being replaced by the AN/MSC-63A Tactical Communications Center. The AN/MSC-63A provides automatic processing, dissemination, and storage of message traffic. When deployed, it provides automated data communications support for processing record General Service (GENSER) message traffic to the MEB commander. The system consists of three functional areas - the shelter and auxiliary support subsystem, the communications subsystem, and the data processing subsystem. The AN/MSC-63A provides eight full-duplex and two receive-only secure communications channels. It is housed on one ISO shelter, weighs 700 lbs, and is transported by one 5-ton

truck. Two AN/MSC-63A are currently being used in Saudi Arabia with great success. See Table 3-1 for mobility comparisons.

6. RESULTS

The communications capability of the MEB will be increased as the equipment changes we have discussed have been implemented. The greatest impact has been in the capability for increased speed of movement and decreased strategic lift requirements through the a in size and weight. When all the changes have been made, the MEB communications Big Boxes will be 57% smaller and weight 52% less than they do currently.

THE MARINE AVIATION COMMAND AND CONTROL SYSTEM

The Marine Aviation Command and Control System (MACCS) has the largest communication architecture in the MEB Command Element. Its size is due in part to the diverse mission of the MACCS - which is to provide extensive communication and connectivity (both voice and data) for aircraft command and control while operating in a MIC/HIC environment. The MACCS of the future (MACCS 2000) requires systems that are distributed, netted, and automated with the capability to operate in degraded modes. These future systems must be less manpower intensive, lighter, more mobile, more responsive, highly survivable, and capable of

sustaining operations with little or no external support for a considerable period of time. In a word, MACCS 2000 must be expeditionary -- as expeditionary as the force it supports.

The specified missions of the MACCS are to:

1. Exercise authority and control over all air and antiair warfare operations in the MAGTF's area of responsibility.
2. Direct, manage, coordinate, and integrate air activity in MAGTF airspace through the accomplishment of tasks such as airspace management (including air traffic control) and terminal control of aircraft, missiles, and unmanned aerial vehicles (UAVs).
3. Direct, manage, coordinate, and integrate all sensors and weapons systems dedicated to the MAGTF's airspace management function and prosecution of the six functions of aviation.
4. Integrate and interoperate with higher, lower, and adjacent echelons of command engaged in control of air and antiair warfare operations.

The initial elements of the MACCS ashore must be lightweight, man-portable, and modular. A basic system capable of providing short range surveillance and air defense to the MAGTF. Additionally, they must be capable of

receiving, processing, and exchanging information from both airborne and shipboard systems. As the demand for more air traffic control (ATC) services grows larger, more capable modules, transported by lightweight vehicles, will be brought ashore. Finally, long range surveillance and engagement capable systems will be embarked, transported by M-900 series, heavy vehicles. All ground-based MACCS elements ashore will be either man-portable or vehicular-mounted with internal power supplies.

Currently four programs in progress decrease the MACCS size while increasing its capability. They are the Advanced Tactical Air Command Center (ATACC), the Tactical Air Operations Module (TAOM), the Improved Direct Air Support Center (IDASC) product improvement program phase III, and the Remote Landing Site Tower.

1. HOW THE DATA WAS COLLECTED

The information contained in this section was primarily obtained through interviews conducted at both the Marine Corps Acquisition and Development Command and the MAGTF Warfighting Center, and through questionnaires sent to the Fleet Marine Force. Each piece of equipment discussed has an individual project officer responsible for its development and procurement. Additional information was obtained from a conference held between FMFLANT and FMFPAC to identified the communication equipment requirements of a

MEB. In some cases items identified by the conference are currently being upgraded or replaced in order to increase capability and decrease the overall weight and size. The upgraded systems will be implemented within the next five years. For the purpose of this paper, only these agencies within the MACCS were examined -- the Tactical Air Control Center (TACC), the Tactical Air Operations Center (TAOC), the Direct Air Support Center (DASC), and the Marine Air Traffic Control and Landing System (MATCALS.)

2. EQUIPMENT REPLACEMENTS

a. The ATACC provides a semi-automated command center to the Aviation Combat Element (ACE). The ATACC can interface with other services and NATO on near-real-time tactical digital information links (TADIL'S) to conduct the tactical air war. The ATACC also provides automated assistance to the ACE planning staff for the allocation, allotment, tasking, scheduling, and coordination of aviation assets.

The ATACC will replace the current AN/TYQ-1 and AN/TYQ-3A equipment. The new system will consist of four 8' x 8' x 20' ISO standard shelters, replacing the two 24' x 64' shelters used by the current TACC (See Table 3-2.) The ATACC shelters will contain universal consoles to display the air battle graphically (using TADIL inputs.) The new shelters' desk top terminals will be used by the ACE

commander's staff to enter, store, process, recall, and display information. This new equipment will allow the ACE commander to conduct the air defense of the MAGTF, the Offensive Air Support (OAS), Assault Support, Air Reconnaissance, Electronic Warfare, and control subordinate agencies simultaneously. The ATACC will also contain manual status boards for use as a backup system.

Two of these ATACC shelters will form a MEB TACC (four are required to support a MEF.) These advanced TACCs will have complete automated link capability -- one TADIL A Link, five TADIL B Links, one NATO Link-1, seven Message Text Format (MTF) links, and numerous single channel links. Additionally, the ATACC will have the capability to load operation orders, Naval Warfare Publications, Defense Mapping Agency tapes, Joint Munitions Effectiveness Manuals, and countless other references into its data base for storage and display as required. The ATACC also increases the number of displays and entries by over 200%.

The ATACC will decrease the weight requirement by 21%, the cubic feet requirement by 13%, and required helicopter lift by 50%. This reduction is accomplished by using two OE334/TRC antenna coupler groups (contained within S-280 shelters) and two ISO shelters rather than the two 24' x 64' inflatable shelters and eight S-type shelters currently used.

MACCS MOBILITY COMPARISON

	AIRLIFT					SHORT
	C-5	C-141	LST	SQ FT	CU FT	TON
TACC	2	10	.2	2100	2,435	147
ATACC	1.75	8.7	.17	NA	2,119	116
TAOC	9	23	1.4	13,359	1,840	505
TAOM	2.5	4	.8	6,680	NA	353
IDASC •	1	2	.05	1,089	8,600	48.7
MATCALS •	17.5	22	1.2	1300	83,035	399

• COMPARISON DATA NOT AVAILABLE

TABLE 3-2

b. The Tactical Air Operations Module (TAOM) is a shelterized (Standard 8' x 20' ANSI ISO Shelter), transportable, modularized, software intensive, automated aviation command and control system (See Table 3-2.) It is capable of controlling and coordinating the employment of a full range of air defense weapons from aircraft to surface-to-air missiles. The TAOM is interoperable with other services and allied tactical C3I systems through voice and data interfaces. Because of its modular construction, redundant capability, and high degree of mobility, the TAOM is less vulnerable and thereby more survivable. The TAOM provides greater weapons control and communicating

capability yet has less equipment and requires fewer personnel than the current TAOC. The TAOM will be transportable by all standard tactical means including helicopter, truck, ship, and fixed-wing aircraft. The basic element of the TAOM is the operational module (OM). A single OM, housed in a standard 8 x 8 x 20 foot ANSI ISO shelter, contains all mission essential equipment with the exception of search radars, Identification Friend or Foe, and prime power equipment.

The MEB TAOM, comprised of the two ISO shelters and four shelters vice the TAOCs nine S-280 type shelters, provides a 30% reduction in weight and a 50% reduction in square footage over the TAOC.

3. EQUIPMENT UPGRADES

a. The downsized Direct Air Support Center (DASC) Program (PIP Phase III) is designed to accomplish two goals. First, it provides the current DASC (AN/TSP ISS and OE-334 antenna coupler unit) with automated modular echelon capability. And second, it provides a small, highly mobile, automated aviation C2 agency, capable of co-locating and keeping pace with the smaller GCE tactical COCs. The Downsized DASC concept involves a HMMWV mounted modular system using two SICP shelters and two AN/GRC 206 equipped MRC vehicles. The new system features automated workstations that provide the operator with computer

generated graphics, near-real- time exchange and retrieval of information, an interface with the Position Location Reporting System (PLRS), DCT application software, and TADIL A information. Not only does this approach provide the DASC maximum flexibility in supporting the MAGTF, but it better enables the DASC to keep up in a fast moving ground campaign. Additionally, the new system allows the DASC to maintain continuity while displacing by exchanging large amounts of information instantly. Although no data is available regarding the reduction in size, and weight, the downsized IDASC would significantly reduce the DASC logistic and operational footprint (See Table 3-2.)

b. Marine Air Traffic Control and Landing System's (MATCALS) only programmed upgrade is the AN/TPS 73 air surveillance radar. It will replace the older AN/TSQ 107B radar resulting in a reduction in size and weight of approximately 50%.

4. FUTURE CONCEPTS

The Air Traffic Control Landing Sight Tower (RLST) concept is intended to reduce the embarkation size of the MEB ATC detachment and provide tactical ATAC services. The RLST is designed to allow aircraft to operate from remote landing sites or forward operating bases. Using this tower will increase responsiveness through flexible basing and increase survivability by dispersing aircraft. The RLST

comprises five non-developmental systems. The AN/TPN-30B (TACON Modified ILS Navigation Aid), the AN/GRC 206 vehicle mounted radio system, a Global Positioning System terminal, a digital communication terminal, and the AN/PVS-S night vision system (See Table 3-2.) The combined effects will allows a highly mobile ATC detachment to provide limited all-weather, day or night, launch and recovery capability.

5. RESULTS

The increased capability, flexibility, and interoperability of the MACCS will give every MEB an aviation C2 system capable of operating throughout the spectrum of conflict. The MACCS of the future will multiply the MEB's lethality by increasing its ease of movement and essential information flow.

SPECIAL INTELLIGENCE COMMUNICATIONS AND SIGNAL INTELLIGENCE

In determining what special intelligence (SI) communications and signals intelligence (SIGINT) systems to deploy, the commander must examine the mission and the threat. A humanitarian assistance MAGTF's assets would differ greatly from those of a MAGTF employed in a mid-intensity conflict. Additionally, the more sophisticated the threat's communications infrastructure, the more SIGINT assets the commander will require to exploit that intelligence source. A radio battalion detachment in

support of a MEB in a mid-intensity conflict should be able to deploy with SI communications, COMINT collection, direction finding, and analysis systems in team-portable or bench-mounted configurations. MCRDAC is well aware of the requirement for lighter and more mobile systems and working hard to meet these goals.

1. HOW DATA WAS COLLECTED

Data was collected by interviewing individual project officers at the MCRDAC, and reviewing technical manuals, point papers, and briefing on pertinent equipment.

2. EQUIPMENT UPGRADES

a. For SI communications support, the MEB can either deploy with the AN/MSC-63A communications systems or the Near Term Team Portable Special Security Communications Terminal (NTSSCT). The AN/MSC-63A is designed to support the message center operations of a MAGTF and serve as a message switch for other systems such as the Intelligence Analysis Center (IAC), Technical Control and Analysis Center (TCAC), and Tactical Electronic Reconnaissance Processing and Evaluation System (TERPES). It performs routing within a command based on message internals (See Figure 3-1.) Each MSC-63A can terminate eight KG-84C secured circuits and eight local terminals. The systems, when located at the Command Element and each major subordinate command down to

EMPLOYMENT OF AN/MSC-63A

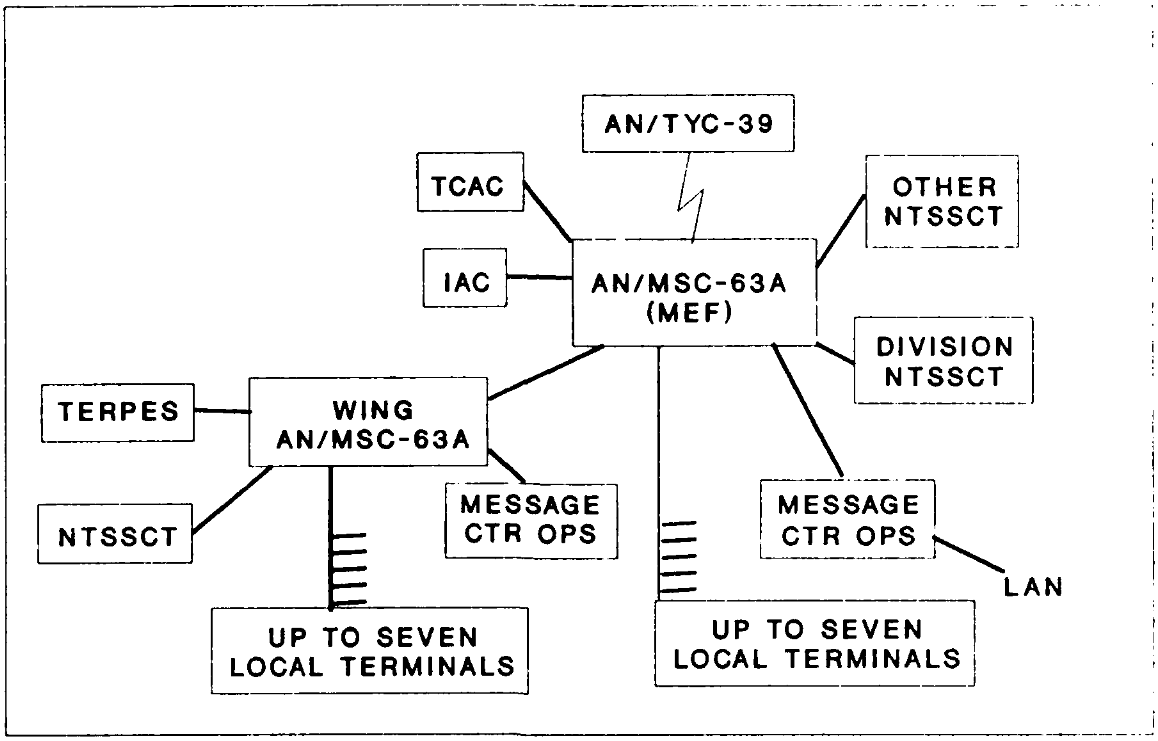

FIGURE 3-1

the division/wing level, form a communications backbone that consolidates the MAGTF's external record traffic communications requirements.

The NTSSCT is a versatile, light weight, high speed, secure, portable communications terminal use to terminate one or two record traffic SI communications circuits to a UYK 83/85 computer. It is capable of operating over any full duplex communications path; however, changing from one path to another requires some internal wiring changes. While the NTSSCT is a much lighter, mobile system, it does have some limitations in comparison to the MSC-63A.

The NTSSCT is unable to net additional NTSSCT systems within the MAGTF; thus, each NTSSCT must access a switch. Additionally, several fielded communications systems depend upon the AN/MSC-63A for automatic access to AUTODIN and DSSCS (See Figure 3-2.) The NTSSCT is unable to support these requirements.

SPECIAL COMM. CONNECTIVITY

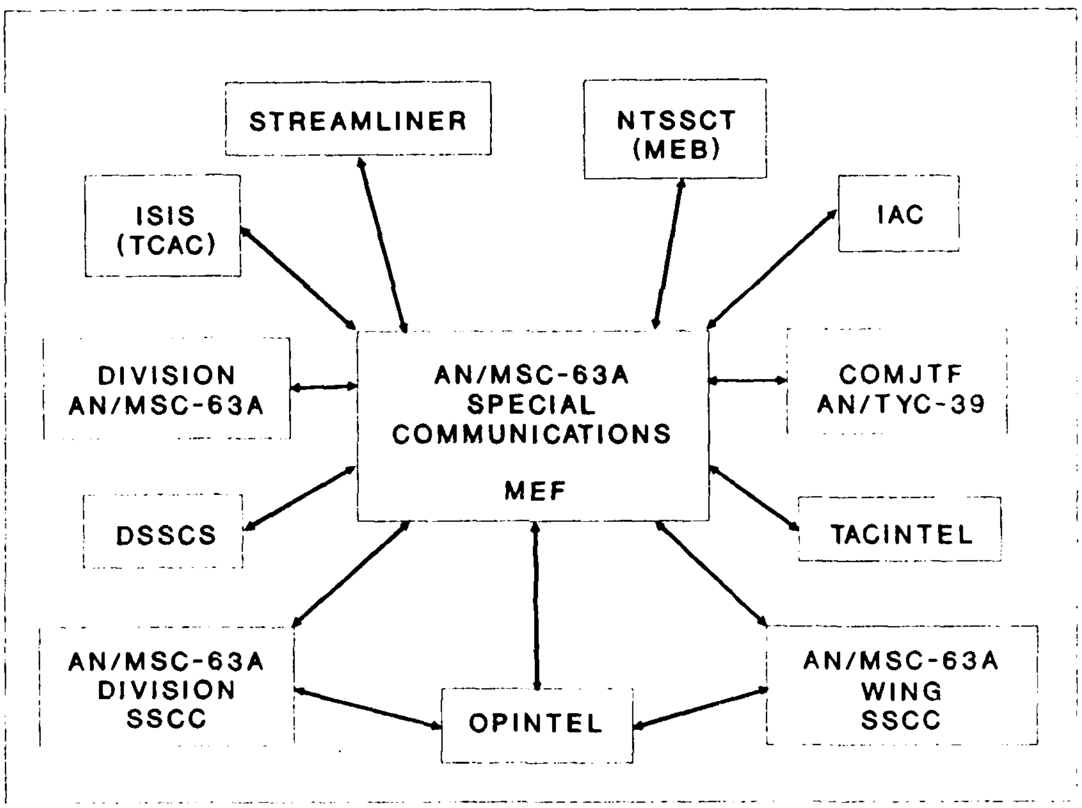

FIGURE 3-2

While the NTSSCT significantly reduces the commander's logistics requirements (i.e. a UYK-83/85 compared to a

shelter mounted communications center, MEP Generator and M-900 series tactical vehicle), some type of "big box" switching system such as the AN/MSC-63A or TYC-39 will still be required within the MEB or higher headquarters to provide a more robust communications network.

b. The Technical Control and Analysis Center(TCAC) AN/TSQ-130 is a computer based joint United States Marine Corps/United States Army Command, Control, Communications, Intelligence (C3I) system that supports radio battalion operations at the MEF/MEB level. It provides automated support of command and control for tactical communications-intercept, direction-finding, and jamming resources for signals intelligence and ground based electronic warfare operations. The TCAC responds to the MAGTF commander's operational needs by tasking and managing communications-intercept, direction-finding, and electronic counter-measures systems. It also processes and stores sensor reports, supports user analysis of these reports, and puts the reports in a standardized format to better support the commander and his staff.

The TCAC provides for DSSCS entry via the AN/TYC-39, AN/MSC-63A and interfaces with other TCACs. Additionally, the system provides for interface with organic work stations remoted to forward command elements, as well as the DF, COMINT, and ECM systems the TCAC controls. The system is mounted in a S-280 military tactical shelter, transportable

by M-900 series vehicles, and powered by a MEP generator. The remote work station can communicate with the host processor mounted in the shelter by either wire or radio. The remote work station can send and receive reports and files from the TCAC to support the forward deployed commander. The remoted station, however, cannot task and manage the deployed sensor system; the host processor is required for that operation.

While the TCAC is a good analytical tool, the net radio protocol (NRP) and the logistics associated with deploying the system cause concern. The NRP within the TCAC queries and controls the direction-finding and collection-out stations. The U.S. Army's out-stations are equipped with NRP interface devices, the Marine Corp's are *not*. The lack of these devices effectively nullifies the system's automated C3I function. Tasking and reporting are done manually via the collection or DF flash net between the out station and OCAC, greatly reducing speed and efficiency. Thus for the Marine Corps, the TCAC is more an analytical tool than an automated C3I system.

3. FUTURE EQUIPMENT

Top Hunter is a team portable, COMINT, direction-finding, and processing and analysis system being produced by NSA to Army and Marine Corps specifications. The entire system is team portable and requires neither shelters nor

vehicle transportation. The system is divided into three sections -- a communications-intercept and direction-finding section, an analysis section, and a communications section (See Figure 3-3.)

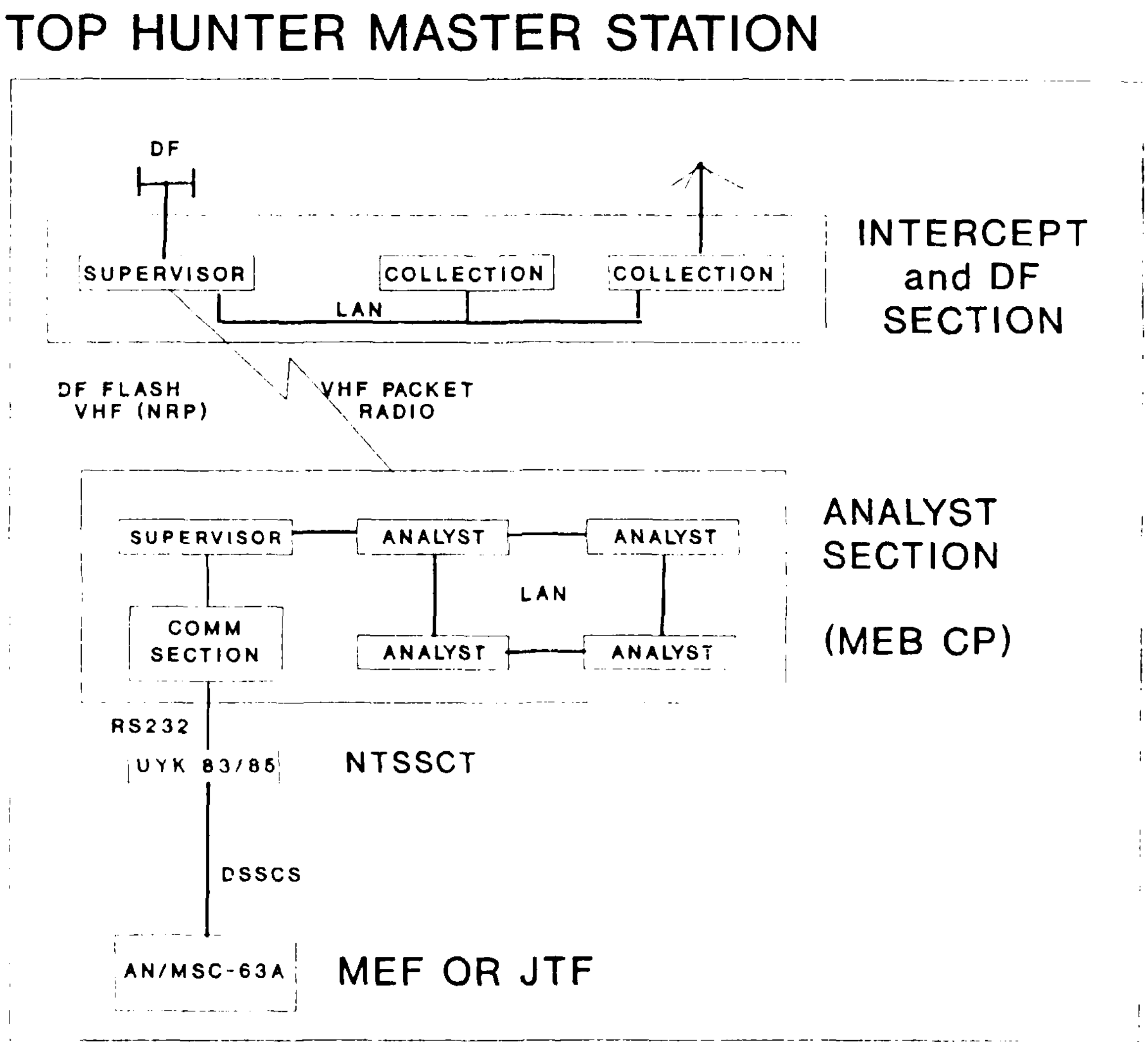

FIGURE 3-3

The intercept and direction-finding section is manned by three Marines at each of the three to four outstations.

Two of the Marines man the collection/DF positions while the third is the outstation supervisor. The three positions are tied into a local area network (LAN) utilizing GRID computers. When one of the operators intercepts a signal, he opens a collection file containing the pertinent facts of the intercept. The report is sent via the LAN to the supervisor, who checks the report for correctness. Once the report is checked, the supervisor sends it to the analysis center over VHF packet radio at 2400 BPS (See Figure 3-3.)

The analysis section is manned by five Marines, four analysts and a supervisor. Once the report reaches the analysis section, it is automatically saved in the host computer. An individual analyst can then call up the report, study it, and write the TACREP using his GRID computer. Once complete, the TACREP is sent via the LAN to the supervisor's position. After the supervisor approves it, the TACREP is sent to the communications section (See Figure 3-3.)

When the TACREP reaches the communication section, it is formatted to DOI 103 standards and sent by either wire or radio to the TCAC or AN/MSC-63A for release and dissemination. However, by co-locating the NTSSCT's UYK-83/85 with the analysis/comm section, the message can be passed from the GRID to the UYK-83/85 via the RC-232 cable. Since the report is already in the proper format, it can be released almost instantaneously. A C3I system, such as the

TCAC mentioned earlier, should be team-portable and easily supported. The Top Hunter system will satisfy this requirement.

4. RESULTS

An NTSSCT and a Top Hunter master station mounted in the rear of an M-900 series vehicle will give the commander a highly mobile Operations Control and Analysis Center (OCAC) and SI communications center. This C3I configuration will reduce the commander's logistics burden from three M-900 series vehicles, three ISO shelters, and associated generators, to a unit that will fit in the back of a pick-up truck or the corner of a CP tent. While this system gives the commander slightly less capability, it is a favorable trade-off for the added mobility and lightened logistics load.

CONCLUSIONS

The preceding pages have presented the current plans for reducing the Big Boxes in the MEB. We have concentrated on how we are reducing the size and weight of the equipment in each of three areas. What we have seen is that as more capable systems are developed, technology has allowed us to reduce the size and support required for those systems. An overall reduction of 50% in 5 years is realistic, given the

current planning. But, is a reduction of 50% in 5 years sufficient?

The answer is yes. The adequacy of size and weight reduction of the Big Boxes should not be measured by airlift sortie requirements or sealift transit time. Instead, the reduction effect should be measured by the impact it has on the individual MAGTF commanders decision. The goal in reducing the Big Box should be to provide the commander with maximum flexibility in developing and selecting his courses of action. If the commander must concentrate more on how to put the equipment ashore versus how to fight the battle then the flexibility of that commander has been affected. In deciding what equipment needs to be reduced, our primary motivator should be the effect each reduction will have on the flexibility of that MAGTF commander's to employ that piece of equipment.

As the Marine Corp prepares to fight in the future, it will fight with less equipment and manpower. The edge used to win may be found in today's technology. But as we rush to shrink equipment and improve capabilities, we must weigh the benefits that can be obtained. We must define our future equipment needs based on warfighting criteria and not solely on available technology.

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GLOSSARY

ATC	Air Traffic Control
AUTODIN	Automatic Digital Network
AN/TYC-39	Automatic Message Switch
BPS	Bits Per Second
C2	Command and Control
C3	Command, Control and Communications
C3I	Command, Control, Communications and Intelligence
COMINT	Communications Intelligence
DSSCS	Defense Special Security Communications System
FMFLANT	Fleet Marine Force Atlantic
FMFPAC	Fleet Marine Force Pacific
GCE	Ground Combat Element
GRID	Lap-top Computer
HF	High Frequency
HIC	High-intensity Conflict
HMMWV	Highly Mobile Multi-Wheeled Vehicle
KG-84C	Encryption/Decryption Device
M-900 Vehicle	5-ton Tactical Vehicle
MAGTF	Marine Air/Ground Task Force
MCRDAC	Marine Corp Research, Development and Acquisition Command
MEB	Marine Expeditionary Brigade
MEF	Marine Expeditionary Force
MEP	Mobile Electric Power

GLOSSARY (Cont'd)

MIC	Mid-intensity Conflict
NSA	National Security Agency
SHF	Super High Frequency
TACREP	Tactical Report
UYK 83/85	Desktop Computer (military specs)